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Case Report

Asymptomatic eosinophilia due to gnathostomiasis

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SUMMARY

The diagnosis of gnathostomiasis typically includes a triad of eosinophilia, migratory skin lesions, and exposure risk. The cutaneous manifestations are protean yet often involve intermittent migratory swellings and creeping skin eruptions with abscesses or nodules, which vary in onset and duration. We report the first case of gnathostomiasis presenting as fever and eosinophilia without cutaneous migratory and internal organ involvement.

1. Introduction

Asymptomatic parasitic eosinophilia is most often attributed to infections defined as strongyloidiasis, schistosomiasis, and filariasis. Gnathostomiasis, another parasitic infection, typically includes a triad of eosinophilia, migratory skin lesions, and exposure risk, such as travel to the Asia-Pacific region.[1] The cutaneous manifestations are protean yet often involve intermittent migratory swellings, creeping eruptions, and skin abscesses or nodules, which vary in onset and duration. We report a case of gnathostomiasis presenting as fever and eosinophilia without migratory cutaneous involvement.

2. Case report

A 34-year-old Thai male farmer from Ubon Ratchathani, with a history of hemoglobin H Constant Spring disease, presented with 7 days of fever and no other specific symptoms. He reported rice paddy harvests in the prior month, as well as the ingestion of uncooked fish, pork, and beef. On admission, his temperature was 38 °C, heart rate 92/min, respiration rate 18/min, and blood pressure 100/60 mmHg. Laboratory data were remarkable for a white blood cell (WBC) count of 24×10^9/l, 55% eosinophils, absolute eosinophil count of 13×10^9/l, and unconjugated hyperbilirubinemia with transaminitis (total bilirubin 2.77 mg/dl (reference range 0.0–1.0 mg/dl), direct bilirubin 0.46 mg/dl (reference range 0.0–0.3 mg/dl), aspartate aminotransferase 329 U/l (reference range 15–37 U/l), alanine aminotransferase 162 U/l (reference range 30–65 U/l), and alkaline phosphatase 124 U/l (reference range 50–136 U/l)). The anti-hepatitis A virus IgM, hepatitis B surface antigen, anti-hepatitis B core IgM, and anti-hepatitis C virus antibody were all negative. Six serial blood cultures were negative and the melioid titer was positive at 1:320 (normal reference ≤1:160 for residents of endemic areas). He was treated empirically for melioidosis with ceftazidime 6 g per day intravenously. Despite defervescence of fever and improvement of leukocytosis, the eosinophilia persisted (Table 1).

Over 10 days, repeated daily stool examinations (×10) for ova and parasites were negative. A chest roentgenogram was normal and abdominal ultrasound and abdominal computed tomography showed no evidence of visceral organ involvement. Rectal biopsies were negative for evidence of Schistosoma infection, serum-specific IgE was <0.35 IU/ml (reference range 0–120 IU/ml), and serology testing conducted at the Faculty of Tropical Medicine, Mahidol University, Thailand, was negative for *Schistosoma mekongi*, *Fasciola gigantica*, and microfilaria (*Brugia malayi*).[2–4] On hospital day 7, Western blot assay for gnathostomiasis using total IgG at 24 kDa band (Mahidol University, Thailand) was positive (Table 1).[5] The presumptive diagnosis of gnathostomiasis with possible melioid co-infection was made and albendazole

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Table 1
Serial laboratory data for a 34-year-old Thai farmer presenting with fever and eosinophilia

	Hospital day					Post-discharge	
	0	2	4	8[a]	14	28	90
Hemoglobin, g%	5.7	5.2	7.3	7.9	8.4	8.8	8.6
Hematocrit, %	20.5	18.5	24.9	28.2	29.4	31.5	31.3
WBC count, $\times 10^9$/l	30	32	22.9	10.5	9	4.8	4.6
PMN cells, %	30	28	28	20	36	60	65
Lymphocytes, %	10	7	8	17	23	19	20
Eosinophils, %	55	57	59	61	34	8.9	4.6
Platelet count, $\times 10^9$/l	165	170	194	192	210	120	123
Total bilirubin, mg/dl	2.77	-	1.59	-	1.4	0.65	-
Direct bilirubin, mg/dl	0.46	-	0.45	-	0.4	49	-
Aspartate aminotransferase, U/l	329	-	281	-	121	90	35
Alanine aminotransferase, U/l	162	-	105	-	76	49	49
Melioid titer	1:320	-	-	-	-	-	-
Immunoglobulin E, U/ml	-	-	<0.35	-	-	-	-
Gnathostoma antibody	-	-	-	Positive	-	-	-
Microfilaria antibody	-	-	-	Negative	-	-	-
Fasciola antibody	-	-	-	Negative	-	-	-
Schistosoma antibody	-	-	-	Negative	-	-	-

WBC, white blood cell; PMN, polymorphonuclear neutrophil.
[a] Start of anti-parasite therapy.

400 mg was given orally twice daily for 21 days. At 4 weeks post-treatment, the WBC count (4.8×10^9/l), eosinophilia (8.9%), and absolute eosinophil count (0.38×10^9/l) were normal (Table 1). Post-treatment thrombocytopenia (122×10^9/l) returned to normal values and was initially consistent with the patient's underlying hemoglobin H Constant Spring disease, with transaminitis presumptively due to hemolysis (Table 1).

3. Discussion

Gnathostomiasis is an important food-borne helminth infection, with reports primarily from Thailand, Japan, and other Southeast Asian countries.[1] Human gnathostomiasis is generally characterized by the migration of parasites into various tissues or organs (e.g., central nervous system), or alternatively, external cutaneous migration after treatment.[1] Before available serologic diagnostic tests, gnathostomiasis was generally diagnosed in subjects meeting the clinical triad criteria of eosinophilia, migratory cutaneous lesions, and a relevant exposure history.

The diagnosis of gnathostomiasis in this case was based on the presence of persistently high eosinophilia, relevant case exposure, and positive serology for gnathostomiasis. The diagnostic utility of total IgG antibodies from gnathostomiasis has previously been evaluated via immunoblot techniques, whereby antigens were prepared from *Gnathostoma spinigerum* advanced third-stage larvae obtained from naturally infected eels.[5] The presence of the 24 kDa band for Gnathostoma third-stage larvae extracted by immunoblot assay had nearly 100% sensitivity, specificity, positive predictive value, and negative predictive value, with no cross-reactivity with other helminthic or other parasitic infections.[5] This enigmatic case of fever and eosinophilia was treated successfully after the gnathostomiasis was confirmed by serology. Notably, he had no evidence of cutaneous lesions, swellings, or urticarial rash. In addition, the patient had a clinical and hematological response to albendazole, evident by normalization of the eosinophil count.

It has previously been recognized that gnathostomiasis cases do not always present cutaneous lesions.[1] Given the diagnostic complexity of gnathostomiasis, clinical suspicion in persons from endemic regions and in international travelers who present with significant eosinophilia, together with prompt serology testing for gnathostomiasis, will expedite early and appropriate treatment to minimize the risk of systemic migration of the parasites.

Conflict of interest: AA and TK were supported by the National Research University Project of the Thailand Office of Higher Education Commission. LMM is an employee of GlaxoSmithKline, LLC (GSK) and this work was conducted pro bono and independently of GSK. There was no conflict of interest for all authors.

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